

Abstract Submitted  
for the DFD19 Meeting of  
The American Physical Society

**Turbulent Faraday instabilities at the interface between miscible fluids** LOUIS GOSTIAUX, Univ Lyon, Ecole Centrale de Lyon, INSA Lyon, Universit Claude Bernard Lyon I, CNRS, LMFA, ANTOINE BRIARD, CMLA, ENS Cachan, CNRS Universit Paris-Saclay, BENOT-JOSEPH GRA, DIF, DAM, CEA Arpajon, France — We studied turbulent mixing between two miscible fluids of different densities occurring when the stable interface between the denser and lighter fluids is periodically accelerated. Vertical oscillations trigger the well known Faraday instability, that degenerates into turbulence in the case of a miscible interface. Very few studies have been dedicated to the thickening and saturation of this turbulent mixing zone, and to the associated mass transfers. We realized a large set of idealized experiments in a large container (72x12x90cm), where a two layer system of fresh and salty water was subject to sinusoidal vertical oscillations. Motion was controlled by a hexapod providing vertical accelerations up to 0.7g. We could predict, for a given Atwood number and forcing parameters, the saturated asymptotic state of the turbulent mixed layer between the two fluids. This process can be used to obtain a well-controlled turbulent interface, which constitutes an interesting initial condition for potential industrial applications. Direct numerical simulations and theoretical developments complete this study.

Louis Gostiaux  
Univ Lyon, Ecole Centrale de Lyon, INSA Lyon, Univ Claude Bernard Lyon I

Date submitted: 05 Aug 2019

Electronic form version 1.4